UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,790	09/17/2001	John William Alden Millar	GRFL-5-PCT	1532

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EXAMINER
LE, TOAN M

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
● **Office Action Summary**	09/936,790	MILLAR ET AL.
	Examiner	**Art Unit**	
	Toan M Le	2863	

-- Th MAILING DATE of this communication appears on the cov r sh t with the correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 March 2003* .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-48* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .	6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or

in public use or on sale in this country, more than one year prior to the date of application for

patent in the United States.

Claims 25-48 are rejected under 35 U.S.C. 102(b) as being anticipated by "Electroseismic

Technique for Measuring the Properties of Rocks Surrounding a Borehole", Millar et al

(Referred hereafter Millar et al.).

Referring to claim 25, Millar et al. disclose a method for measuring the properties of a

formation traversed by a borehole in which a directional seismic or sonic signal is generated

downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an

electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6).

As to claim 26, Millar et al. disclose a method for measuring the properties of a formation

traversed by a borehole in which a directional seismic or sonic signal is generated downhole and

is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal

generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and

in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13)

so that the electrokinetic signals are generated from different zones around the source of the

seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the seismic signal is

generated by the generation of a seismic or sonic shock downhole which propagates a seismic

signal into the surrounding rock (page 8, lines 1-6).

Referring to claim 27, Millar et al. disclose a method for measuring the properties of a

formation traversed by a borehole in which a directional seismic or sonic signal is generated

downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an

electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in

which the direction of the seismic signal is varied in three dimensions azimuthally with respect

to the source of the seismic shock in the borehole (Abstract: lines 10-13; page 8, lines 1-6).

As to claim 28, Millar et al. disclose a method for measuring the properties of a formation

traversed by a borehole in which a directional seismic or sonic signal is generated downhole and

is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal

generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and

in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13)

so that the electrokinetic signals are generated from different zones around the source of the

seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the direction of the

seismic shock is rotated radially about a circle with the source of the seismic shock at the centre

of the circle (Abstract: lines 10-13; page 8, lines 1-6; and page 10, lines 20-23).

Referring to claim 29, Millar et al. disclose a method for measuring the properties of a formation traversed by a borehole in which a directional seismic or sonic signal is generated downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the direction of the seismic shock is rotated radially about a circle with the source of the seismic shock at the centre of the circle (Abstract: lines 10-13; page 8, lines 1-6; and page 10, lines 20-23).

As to claim 30, Millar et al. disclose a method for measuring the properties of a formation traversed by a borehole in which a directional seismic or sonic signal is generated downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the direction of the seismic signal is varied mechanically by physically turning the source (page 10, lines 20-23).

Referring to claim 31, Millar et al. disclose a method for measuring the properties of a formation traversed by a borehole in which a directional seismic or sonic signal is generated downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the seismic signal is substantially uni-directional and the source is rotated so the direction of the seismic signal is rotated and is also moved so that the direction of the seismic signal moves up and down (page 4, lines 6-8; page 10, lines 20-23).

As to claim 32, Millar et al. disclose a method for measuring the properties of a formation traversed by a borehole in which a directional seismic or sonic signal is generated downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the seismic signal is propagated omni-directionally and a shield with an aperture is positioned around the source so that the seismic signal propagates through the aperture and the direction of the seismic signal is changed by moving the location of the aperture (page 3, lines 26-29; page 4, lines 1-5; and page 10, lines 12-19).

Referring to claim 33, Millar et al. disclose a method for measuring the properties of a formation traversed by a borehole in which a directional seismic or sonic signal is generated downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in

which the direction of the seismic signal is changed by wave interference or wave interaction of

two or more sources acting together to produced a seismic signal which is focused in a particular

direction or location and by varying the frequency, amplitude and/or phases of the sources of the

seismic signal the spatial distribution, direction and location of the outgoing seismic signal is

changed (page 9, lines 10-13).

Referring to claim 34, Millar et al. disclose a method for measuring the properties of a

formation traversed by a borehole in which a directional seismic or sonic signal is generated

downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an

electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in

which the direction of the seismic signal is changed by wave interference or wave interaction of

two or more sources acting together to produced a seismic signal which is focused in a particular

direction or location and by varying the frequency, amplitude and/or phases of the sources of the

seismic shock the spatial distribution, direction and location of the outgoing seismic signal is

changed (page 9, lines 10-13).

As to claim 35, Millar et al. disclose a method for measuring the properties of a formation

traversed by a borehole in which a directional seismic or sonic signal is generated downhole and

is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal

generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and

in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13)

so that the electrokinetic signals are generated from different zones around the source of the

seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the source of the

seismic signal is positioned substantially centrally within the borehole and is not in contact with

the borehole wall (page 8, lines 23-24).

Referring to claim 36, Millar et al. disclose a method for measuring the properties of a

formation traversed by a borehole in which a directional seismic or sonic signal is generated

downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an

electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in

which there are two or more separate sources of the seismic shock spaced apart from each other

and there are means to vary the amplitude, frequency and/or phase independently and the source

of the seismic signal propagates a seismic signal in substantially all directions so that the

direction of the combined signal produced can be varied in three dimensions (page 9, lines 10-

13).

As to claim 37, Millar et al. disclose a method for measuring the properties of a formation

traversed by a borehole in which a directional seismic or sonic signal is generated downhole and

is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal

generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and

in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13)

so that the electrokinetic signals are generated from different zones around the source of the

seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which each seismic source

continuously emits sound simultaneously on at least two finite frequencies with the resultant

oscillation being the sum of the various sinusoidal pressure oscillations and by variation and

combination of these signals the direction of the combined signal is varied (page 9, lines 10-13).

Referring to claim 38, Millar et al. disclose a method for measuring the properties of a

formation traversed by a borehole in which a directional seismic or sonic signal is generated

downhole and is propagated into the surrounding formation (Abstract: lines 1-6) and an

electrokinetic signal generated by the seismic or sonic signal is detected by detecting means

(Abstract: lines 7-9) and in which the spatial distribution of the outgoing seismic signal is

adjusted (Abstract: lines 10-13) so that the electrokinetic signals are generated from different

zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in

which the electrokinetic signals generated are amplified and demodulated with respect to the

source frequencies and the amplitude and phase relative to the source sampled at a frequency of

1-100 Hz per channel and converted from analogue to digital form, of 12 or 16 bit accuracy

(page 5, lines 20-23).

As to claim 39, Millar et al. disclose a method for measuring the properties of a formation

traversed by a borehole in which a directional seismic or sonic signal is generated downhole and

is propagated into the surrounding formation (Abstract: lines 1-6) and an electrokinetic signal

generated by the seismic or sonic signal is detected by detecting means (Abstract: lines 7-9) and

in which the spatial distribution of the outgoing seismic signal is adjusted (Abstract: lines 10-13)

so that the electrokinetic signals are generated from different zones around the source of the seismic or sonic signal (page 3, lines 5-8; and page 8, lines 1-6) in which the seismic signal is generated whilst the source of the seismic signal is lowered or raised up from the borehole to provide a continuous or semi-continuous measurement of rock along the borehole (page 9, lines 16-18).

Referring to claim 40, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6).

As to claim 41, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6) in which the seismic source means for generating the seismic signals generates a series of pressure pulses or a continuous pressure oscillation, at one or more finite frequencies (page 10, lines 7-11).

Referring to claim 42, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6) in which the seismic source means for generating the seismic signals is a magnetostrictive or piezoelectric transducer whose signal is controllable electrically (page 10, lines 24-26).

As to claim 43, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6) in which the seismic source means for generating a seismic signal comprises a cylindrical chamber having holes in its side, which, when downhole, will be full of drilling fluid with the sides of the chamber being close to the sides of the borehole, there being a means to transmit a shock or applied force to the fluid in the chamber so as to cause the shock to be transmitted through the fluid in the chamber through the holes into the surrounding rock (page 10, lines 12-19).

Referring to claim 44, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6) in which the electrical receiver consists of one or two pairs of electrodes forming a short dipole antenna with electrically isolated ends or two with electrically isolated lines, the ends of which being connected to an amplifier which amplifies the signals whilst keeping them electrically isolated (page 11, lines 5-13).

As to claim 45, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means for generating seismic signals (page 10, line 3) and a means for varying the direction of the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal generated by the seismic source means (page 10, lines 5-6) in which there are means to physically turn the seismic source means to vary the direction of the seismic signal (page 10, lines 20-23).

Referring to claim 46, Millar et al. disclose an apparatus for measuring the properties of rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source

means for generating seismic signals (page 10, line 3) and a means for varying the direction of

the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect

electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal

generated by the seismic source means (page 10, lines 5-6) in which there is a shield with an

aperture positioned around the seismic source which source is adapted to propagate a seismic

signal omni-directionally so that the seismic signal generated propagates through the aperture

and there are means to move the location of the aperture so the direction of the seismic signal is

varied (page 10, lines 12-19).

As to claim 47, Millar et al. disclose an apparatus for measuring the properties of rocks

surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to be

lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source means

for generating seismic signals (page 10, line 3) and a means for varying the direction of the

seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect

electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal

generated by the seismic source means (page 10, lines 5-6) in which there are two or more

sources of seismic signals acting together and means to vary the direction of the seismic signal

by wave interference or wave interaction of the two or more sources to produce a seismic signal

which is focused in a particular direction or location and means to vary the frequency, amplitude

and/or phases of the sources of the seismic shock to change the spatial distribution, direction and

location of the outgoing seismic signal (page 9, lines 10-13).

Referring to claim 48, Millar et al. disclose an apparatus for measuring the properties of

rocks surrounding a borehole (page 10, lines 1-2), which apparatus comprises a casing adapted to

be lowered down a bore hole (page 10, lines 2-3), in which casing there is a seismic source

means for generating seismic signals (page 10, line 3) and a means for varying the direction of

the seismic signal and having associated therewith (page 10, lines 3-4), a means adapted to detect

electrical signals generated in the rock surrounding the bore hole by the effect of a seismic signal

generated by the seismic source means (page 10, lines 5-6) in which there are two or more

separate sources of the seismic shock spaced apart from each other and there are means to vary

the amplitude, frequency and/or phase independently of the seismic shock, the source of the

seismic shock being able to propagate a seismic signal in substantially all directions so that the

direction of the combined signal produced can be varied in three dimensions (page 9, lines 10-

13).

Remarks:

Response to Arguments

Applicant's arguments with respect to claims 25-48 have been considered but are moot in

view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

U.S. Patent No. 4,427,944 to Chandler	U.S. Patent No. 3,599,085 to Semmelink
U.S. Patent No. 5,503,001 to Wong	U.S. Patent No. 5,417,104 to Wong
U.S. Patent No. 5,689,068 to Locatelli et al.	

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (703) 305-4016. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703) 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0655.

Toan Le

June 2, 2003

BRYAN BUI
PRIMARY EXAMINER

6/2/03